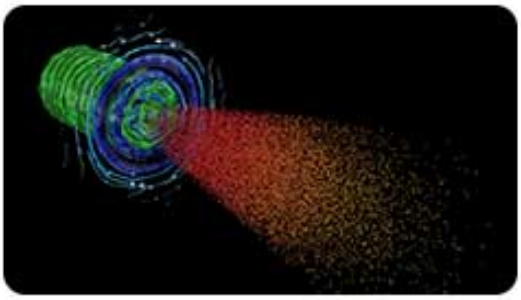
LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, March 25-29, 2013.

HPCwire GOING CORE-AZY



OSIRIS simulation on Sequoia of the interaction of a fast-ignition-scale laser with a dense DT plasma.

A couple of months ago, Lawrence Livermore National Laboratory's Sequoia supercomputer broke the million core barrier for a real-world application; now it's done it again. This time, not only has Sequoia surpassed the 1.5 million mark, but researchers have successfully harnessed all 1,572,864 of the machine's cores for one impressive simulation.

Frederico Fiuza, a physicist and Lawrence Fellow at LLNL, used what are known as particle-in-cell (PIC) code simulations on Sequoia as part of a fusion research project. The simulations provide a detailed look at the interaction of powerful lasers with dense plasmas.

These simulations are allowing researchers, for the first time, to model the interaction of realistic fast-ignition-scale lasers with dense plasmas in three dimensions.

Each simulation evolves the dynamics of more than 100 billion particles for more than 100,000 computational time steps. This is approximately an order of magnitude larger than the previous largest simulations of fast ignition.

To read more, go to HPCWire.

green TECHNOLOGY WORLD™ PASSING GAS

A new center will certify standards for shale development.

There's plenty of natural gas underground in shale formations. Now a new center to certify standards for shale development has been established by a group of environmental advocacy organizations, philanthropic foundations and energy companies.

The unique center will provide natural gas producers with certification of performance standards for shale development.

The Center for Sustainable Shale Development (CSSD) has established 15 initial performance standards that, constituents believe, will ensure safe and environmentally responsible development of the Appalachian Basin's abundant shale gas resources. These standards will form the foundation of the CSSD's independent, third-party certification process.

Technical support has been provided by Lawrence Livermore National Laboratory, and retired LLNL scientist Jane Long sits on the board of the new center.

To read more, go to *Green Technology World*.

PBS EARTH: THE OPERATOR'S MANUAL

China is the No. 1 producer of clean energy.

In 2010, China invested more on renewable energy than any other nation on earth. Germany was No. 2, and the United States was No. 3, committing roughly half as much as China.

"China's being aggressive on all the clean energy fronts. They're building 100,000 megawatts of wind. They're putting up 10,000 megawatts of solar photovoltaics-- 50,000 megawatts of nuclear," said Lawrence Livermore National Laboratory geoscientist Julio Friedmann, who is in charge of its carbon management program.

Friedmann uses some of the world's fastest supercomputers to study how to store CO2 underground and he's an expert on U.S.-China energy collaboration. "They're not putting all their eggs in one basket, either. They're trying to cover, comprehensively, all the clean energy options."

That includes an old and dirty fuel that China both mines and imports at world-record levels. "China is the world's largest coal producer. It's the world's largest coal user. They're not going to abandon coal any time soon," Friedmann said.

To see more, go to the Web.

CBRNe WORLD FIGHTING THE BAD GUYS

Natalia Zaitseva, a Lawrence Livermore materials scientist, leads a team of researchers that has developed the first plastic material capable of efficiently distinguishing neutrons from gamma rays.

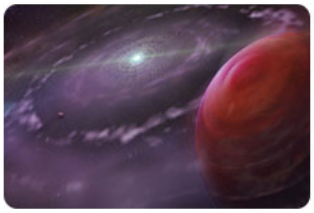
Long before 9/11 was known as the largest terrorist attack on American soil, Lawrence Livermore was deep in research and development in the chemical, biological, radiological, nuclear and high-yield explosives (CBRNE) realm.

LLNL is now a key developer of technical capabilities to protect the U.S. against such terrorist attacks. In recent years, LLNL continues to advance and apply science and technology to ensure U.S. national security within a global context.

When it comes to CBRNE, not only does LLNL have experience in nuclear deterrence, but Laboratory scientists have a long history of developing, deploying and delivering advanced bio-defense capabilities in the United States.

To read more, go to *CBRNe World*.

npr PEERING AT A GAS GIANT



Artist's rendering of the planetary system HR 8799 at an early stage in its evolution. Image courtesy of Dunlap Institute for Astronomy & Astrophysics; Mediafarm.

Recent research shows that peeking into an exoplanet's atmosphere provides clues to how it was formed.

Lawrence Livermore researchers discovered that the atmosphere of a giant gas planet 130 light years away that orbits around the star dubbed HR 8799 was made of water vapor and carbon dioxide. But no methane.

The lack of methane tells scientists that there must be mixing between the different layers of the atmosphere.

Since methane is a sensitive molecule, it can be destroyed when it gets mixed into the deeper, hotter parts of the atmosphere. This mixing provides details about the atmospheric conditions in young Jupiter-like planets.

To read more, go to NPR.
